

WHAT IS CLAIMED IS:

1. A bifurcation stent, comprising:

a tubular member having an inner diameter and an outer diameter defining a wall therebetween, the wall having a geometrical configuration defining a pattern; and

an expandable branch structure formed in the wall of the tubular structure and interrupting the wall pattern, the expandable branch structure having a first ring connected to the tubular member and a second ring connected to the first ring, the first ring being concentric with the second ring,

wherein the second ring substantially surrounds and defines a central branch opening,

wherein the first ring and the second ring are movable from an unexpanded configuration to an expanded configuration, in the unexpanded configuration the first and second rings are disposed along the wall and in the expanded configuration the first and second rings extend outwardly from the tubular member, and

wherein an auxiliary access opening is defined between the first and second rings to provide access to a branch vessel in the unexpanded condition, the auxiliary access opening being larger than the central branch opening in the unexpanded configuration.

2. The stent according to claim 1, wherein the tubular member has a longitudinal axis and the expandable branch structure is disposed substantially perpendicular to the longitudinal axis in the expanded configuration.

3. The stent according to claim 1, wherein the tubular member comprises a plurality of undulating rings disposed along the longitudinal axis and the undulating rings are connected by connectors.

4. The stent according to claim 1, wherein the first and second rings have a common axis disposed substantially perpendicular to the longitudinal axis in the unexpanded configuration.

5. The stent according to claim 1, wherein the branch structure includes a transition ring.

6. The stent according to claim 5, wherein the transition ring comprises a discontinuous portion.

7. The stent according to claim 5, wherein at least one omega shaped connecting member extends between the transition ring and the wall pattern.

8. The stent according to claim 6, wherein at least one connecting member extends through the discontinuous portion and connects the first ring to a portion of the wall pattern outside the extendible branch structure.

9. The stent according to claim 8, wherein the at least one connecting member connects the first ring to an omega shaped strut portion of the wall pattern outside the extendible branch structure.

10. The stent according to claim 5, wherein the second ring is connected to the first ring by a plurality of inner connectors.

11. The stent according to claim 10, wherein the first ring is connected to the transition ring by a plurality of outer connectors.

12. The stent according to claim 11, wherein at least one of the outer connectors is a generally undulating curvilinear member extending toward the center of the branch opening.

13. The stent according to claim 11, wherein the inner and outer connectors are generally straight members and extend toward the center of the branch opening.

14. The stent according to claim 13, wherein the first and second rings are generally continuous undulating curvilinear members and include undulation peaks extending toward the central branch opening.

15. The stent according to claim 11, wherein the intersection of each outer connector with the transition ring forms a pivot point about which an undulation peak may pivot outward in the expanded configuration.

16. The stent according to claim 1, wherein the first and second rings are generally continuous curvilinear members and include undulation peaks, wherein the undulation peaks of the second ring have a radius of curvature of about 0.025 mm to about 0.225 mm.

17. The stent according to claim 15, wherein the undulation peaks of the second ring have a radius of curvature of about 0.125 mm to about 0.225 mm.

18. A bifurcation stent, comprising:

a tubular member having an inner diameter and an outer diameter defining a wall therebetween, the wall having a geometrical configuration defining a pattern; and

an expandable branch structure formed in the wall of the tubular structure and interrupting the wall pattern, the expandable branch structure having a first ring

connected to the tubular member and a second ring connected to the first ring, the first ring being concentric with the second ring,

wherein the second ring substantially surrounds and defines a central branch opening,

wherein the first ring and the second ring are movable from an unexpanded configuration to an expanded configuration, in the unexpanded configuration the first and second rings are disposed along the wall and in the expanded configuration the first and second rings extend outwardly from the tubular member, and

wherein the first and second rings are generally continuous curvilinear members and include undulation peaks, wherein the undulation peaks of the second ring have a radius of curvature of about 0.025 mm to about 0.225 mm.

19. The stent according to claim 18, wherein the undulation peaks of the second ring have a radius of curvature of about 0.125 mm to about 0.225 mm.

20. A bifurcation stent, comprising:

a tubular member having an inner diameter and an outer diameter defining a wall therebetween, the wall having a geometrical configuration defining a pattern; and

an expandable branch structure formed in the wall of the tubular structure and interrupting the wall pattern, the expandable branch structure having a first ring connected to the tubular member and a second ring connected to the first ring, the first ring being concentric with the second ring,

wherein the second ring substantially surrounds and defines a central branch opening,

wherein the first ring and the second ring are movable from an unexpanded configuration to an expanded configuration, in the unexpanded configuration the first and second rings are disposed along the wall and in the expanded configuration the first and second rings extend outwardly from the tubular member,

wherein the branch structure includes a transition ring,

wherein the second ring is connected to the first ring by a plurality of inner connectors and the first ring is connected to the transition ring by a plurality of outer connectors, and

wherein at least one of the outer connectors is a generally undulating curvilinear member extending toward the center of the branch opening.